

ABSTRACT OF THE DISCLOSURE

Disclosed are a method and an apparatus for generating and collecting a secondary compound that includes daughter isotope, such as ^{68}Ga , resulting from the decay of a parent isotope, such as ^{68}Ge , present in a precursor compound. The apparatus includes a generator system comprising a collector vessel, a cold trap and a pump, that are operatively connected to sources for introducing a precursor compound and an eluant solution, and optionally purging gases and oxygen scavengers, into the generator system. In a generation mode a substantial portion of the precursor compound is maintained in or flows through the collector vessel while in recovery mode substantially all of the precursor compound is confined in the cold trap while the collector vessel is flushed with an eluant to remove the collected secondary compound.